

Aquatic macroinvertebrate gut symbionts in Vallforners stream (Barcelona, Spain)

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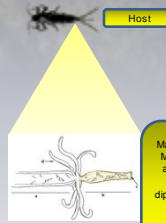
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Introduction

The trichomyces are an ecological group of arthropod gut symbionts. This fascinating group has managed to live inside arthropod's gut by developing special features that allow them to synchronize their biological cycle with its host; trichomyces must grow and attach to a specific environment and reach maturity before the molt period. In addition, host and their gut symbionts can be found in many different habitats, which demands an efficient spreading method, however, this study is focused on freshwater ones.

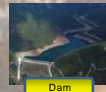
Previously they were considered a natural group within the fungal clade Zygomycota (Manier 1970). Later, the applications of molecular techniques provided insights to establish a new classification: two orders (Amoebidiales and Eccrinales) were classified within the protists and the two other orders (Harpellales, Asellariales) were kept in the fungal branch within the Kickxellomycotina clade (Hibbett et al. 2007).



Work objective

The Montseny massif is a well studied area, but no data related to trichomyces in Vallforners stream was available before this work.

The aim of this work is to provide a catalog of the trichomyces species living in this ecosystem. In addition, the river has a dam which may have an effect on host presence; consequently on trichomyces too; therefore collecting data above (A) and below (B) the dam-level was done to study the differences inflicted by dammed water.

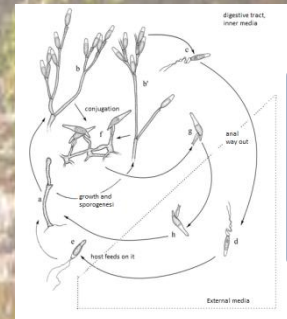


Material and Methods

→ Three field sampling days were done. Samples were collected in the field locations chosen in Vallforners stream (above and below the dam). Extra data was also recorded (pH, temperature).

→ Once in the lab, larvae and nymphs was dissected carefully; host's gut was isolated and prepared for microscope observation.

→ Each trichomyces species found was described to build up the catalog, which was the main goal of the study. Raw data was used to achieve the second goal, which was the description of the differences created by the dam.



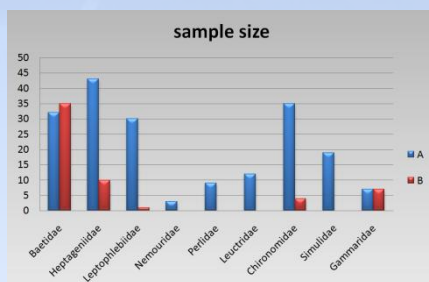
Example of the biological cycle of the trichomyces order Harpellales.

Note that reproductive forms are shown: c: trichospore, asexual reproduction; z: zygospore, sexual reproduction (conjugation).

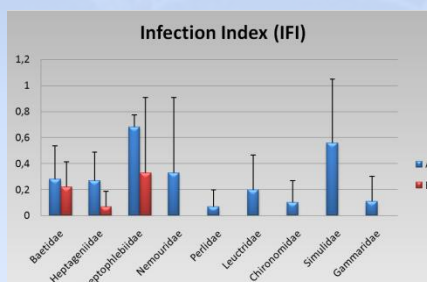
Results: differences between locations

Raw data was used to show differences in host sample size (Graph 1) and calculate Infection Index (Graph 2), other processes, which are not included here, were done to see differences between days. In addition, Simpson's diversity index was calculated for host species in each location. As expected, location A has more diversity than B.

Regarding pH, water after the dam (B) had a slight increase in pH (0,2). On the other hand, temperature change was more significant: A=5,1 | B= 8,3.



Graph 1: Total sample size per host family and location (A and B)



Graph 2: Mean Infection Index per host family and location (A and B). Standard deviation between days is shown above the bars.

Species catalogue



Discussion and conclusions

Despite the fact that time was limited, which is reflected in few field sampling days, this study managed to show a piece of the trichomyces species of the Vallforners stream. Because this stream was not sampled before, all data obtained is new. However some of the species that were found have a special relevance because they have never been reported for the science (new species of the genus *Smittium*) or in the Montseny massif (*Astreptonema gammari*, *Graminella bulbosa* and *Stachylinia euthena*).

Dams retain organic debris, which causes an increase in heterotrophic

life and, therefore, a reduction in water oxygen levels. Furthermore, because less thermal exchange can be done, dammed water usually is warmer than flowing water, which is shown in our results. Those changes in the habitat may constrain the potential presence for most host species. Data obtained from different locations - above (A) and below (B) the dam - support the idea that dammed water can alter host distribution: represented in Graph 1 as sample size-, reduce host diversity and, consequently, affect trichomyces presence, which is represented in Graph 2 as Infection Index.

References

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